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ABSTRACT

This report covers a detailed tabulation of costs and related factors for the years 1971-72, and is divided into two groups. One group of nine has been reporting this data for 5 consecutive years and represents a fairly good cross-section sample of the schools of the area. The other group of ten have reported data for 1 to 4 years. The group of nine's data was analyzed to show trends on a year-by-year basis for the 5 years of this study. Comparisons were made of student credit hours taught, fulltime equivalent students, net space, teaching faculty, total salary expenditures for teaching faculty plus teaching assistance, fulltime equivalent clerical and technician support, salary expenditures for clerical and technician support, operating expenditures, and equipment expenditures. The data was analyzed to show relative impact in terms of use of the resources. An 8-item bibliography and appendix with definitions are included. (Author/MJM)

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Cost and Planning Factors in Engineering Education - A Report to the Administrative Unit of the Southeastern Section of ASEE

by

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As part of a continuing project, the engineering schools in the Southeastern Section of ASEE were surveyed in order to gather appropriate cost and planning factors information for the 1971-72 academic year. This is the fifth year that such a survey has been made. Nine of the institutions have reported data each of the five years, and these have been labeled on the tables that accompany this report as "Nine" institutions. These are:

Alabama, University of (Tuscaloosa campus)
Auburn University
Duke University
Florida, University of
Georgia Institute of Technology
Miami, University of
North Carolina State University at Raleigh
Virginia Polytechnic Institute and State University
Virginia, University of

Other institutions have reported in varied numbers from year to year, and this time there were ten such institutions. These are:

Christian Brothers College
Mississippi State University
Tennessee State University
Tennessee Technological University
University of Alabama in Birmingham
University of Alabama in Huntsville
University of Kentucky
University of Mississippi
University of South Alabama
University of Tennessee

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Tables I-A, I-B, and I-C (on the pages that follow) give the information for all nineteen institutions as it was reported. Totals and averages for each of the two groups have been computed. Schools have been coded, and the same code has been used throughout the various tables and portions of this report.

One of the obvious possibilities when this project was carried from one year to the next was that of comparison over a period of time. This year it was hoped that some of the cost factors could be refined and that information could be gathered which would be somewhat more detailed. Unfortunately, one result of this was to reduce some of the consistency from year to year for some parts of the study. There are some portions, however, that are comparable and consistent, and these are reported later in the report.

TABLE I-A
SOUTHEASTERN SECTION - ASEE
Planning Factors Study
"Nine" Institutions
Data for July 1, 1971 - June 30, 1972

School	A. Allocated Faculty and Professional Personnel F.T.E. as of Fall 1971 - See Definition A						B. Graduate Student Assistants, F.T.E. & $K Yearly-See Definition B			
							Teaching		Research	
	INSTRUCTIONAL 1.	RESEARCH 2.	OUTREACH 3.	ADMINISTRATIVE 4.	TOTAL F.T.E. 5.	TOTAL $K FOR TOTAL F.T.E. YEARLY BASIS 6.	F.T.E. 1.	$(K) 2.	F.T.E. 3.	$(K) 4.
I	98	3	6	24	194	4114	38	378	89	1184
L	93	32	1	10	134	1972	13	99	18	190
M	32	1	0	5	38	618	11	52	29	152
N	93	26	0	5	124	2029	26	53	111	250
O	59	9	4	9	81	1300	7	32	11	49
P	103	25	3	24	156	2691	56	335	39	232
Q	209	82	0	27	292	5624	24	288	39	462
R	144	23	4	14	185	2534	38	142	30	111
S	40	7	1	6	53	828	4	24	3	25
Total	871	278	19	123	1257	21710	217	1403	369	2655
Average	96.8	30.9	2.1	13.7	139.7	2412.2	24.1	155.9	41.0	295.0

"Other Institutions"

B	14	0	0	2	16	214	0	0	0	0
D	11	0	0	1	12	159	0	0	0	0
E	59	24	9	7	100	1454	1	5	1	12
F	88	14	4	3	109	1645	10	66	3	17
G	41	9	2	6	58	895	4	20	20	95
K	86	24	1	18	129	1846	18	0	15	0
T	28	8	0	3	39	578	2	10	18	93
U	11	1	1	1	14	214	0	0	0	0
W	13	0	0	1	14	171	0	0	0	0
X	20	8	0	3	31	503	2	7	13	110
Total	371	88	17	45	522	7679	571	486	144	1511
Average	37.1	8.8	1.7	4.5	52.2	767.9	57.1	48.6	14.4	151.1

TABLE I-A
SOUTHEASTERN SECTION - ASEE
Planning Factors Study
"Nine" Institutions
Data for July 1, 1971 - June 30, 1972

School	C. Allocated F.T.E., and $(K) Yearly - Other Personnel - See Definition C				D. Instructional Load - Student Credit Hours, Semester Basis - Total Academic Year - See Definition D			
	Clerical		Technicians					
	F.T.E. 1.	$(K) 2.	F.T.E. 3.	$(K) 4.	Lower Level U.G. 1.	Upper Level U.G. 2.	Beginning Graduate Level 3.	Advanced Graduate Level 4.
I	99	587	72	599	700	22,300	7,200	5,800
L	33	152	22	166	8,600	22,800	(1,400)	
M	8	41	9	73	3,800	3,100	900	200
N	21	123	18	165	11,557	12,127	2,410	1,084
O	21	96	9	89	5,784	6,994	707	373
P	42	245	21	206	10,700	27,500	3,800	2,200
Q	61	427	34	340	17,100	48,800	(16,500)	
R	30	155	26	233	15,100	26,400	(7,200)	
S	12	73	6	52	5,800	5,500	2,400	500
Total	327	1899	217	1923	79,141	175,521	(46,874)	
Average	36.3	211.0	24.1	213.6	8793.4	19502.3	(5208.2)	

"Other Institutions"

B	4	20	1	7	1,800	2,300	0	0
D	2	9	2	14	2,010	2,926	0	0
E	26	142	31	221	4,373	9,663	(1,889)	
F	21	96	21	173	1,800	14,800	(1,800)	
G	28	117	12	77	5,787	13,149	2,278	29
K	30	372	52	0	4,605	9,923	1,974	372
T	8	30	5	36	3,300	2,200	(1,500)	
U	2	11	1	6	428	2,705	243	0
W	2	8	0	0	1,600	1,500	0	0
X	8	44	2	14	1,600	1,800	1,000	1,300
Total	132	849	127	548	27,303	60,966	(12,385)	
Average	13.2	84.9	12.7	54.8	2730.0	6096.6	(1238.5)	

TABLE I-C
SOUTHEASTERN SECTION - ASEE
Planning Factors Study
"Nine" Institutions
Data for July 1, 1971 - June 30, 1972

School	E. Other Planning Factors See Definition E			F. Division of Total Budget $(K) as to Source of Funding See Definition F					
				Instructional		Research		Outreach	
	Non-Salaried Operational Budget $(K) 1.	Laboratory Equipment 1971-72 $(K) 2.	Net Spaces Available $Ft.^2$ (K) 3.	Inside 1.	Other 2.	Inside 3.	Other 4.	Inside 5.	Other 6.
I	1056	624	358	4269	0	1185	2974	67	45
L	146	69	206	2022	0	170	583	14	5
M	323	269	68	54	150	0	119	0	0
N	114	80	167	2752	0	0	2998	0	0
O	69	15	196	1376	4	39	153	65	13
P	148	336	286	3102	390	179	1829	92	4
Q	332	329	641	5163	132	1008	1493	0	0
R	587	293	204	2186	0	1400	400	69	0
S	43	16	68	896	0	15	143	7	0
Total	2818	2031	2194	(22,496)		(14,688)		(381)	
Average	313.1	225.7	232.7	(2499.5)		(1632.0)		(42.3)	

"Other Institutions"

B	7	22	19	218	53	0	0	0	0
D	6	40	31	205	23	0	0	0	0
E	140	71	149	1141	43	507	72	420	38
F	192	76	198	(1759)		(159)		(74)	
G	201	68	107	1015	0	133	284	22	18
K	181	116	185	2682	0	1385	0	0	0
T	77	35	85	559	49	141	110	0	0
U	10	15	19	182	0	0	10	10	12
W	5	3	7	183	3	0	0	0	0
X	55	68	100	393	0	0	84	0	0
Total	874	514	900	(8508)		(2885)		(594)	
Average	87.4	51.4	90.0	(850.8)		(288.5)		(59.4)	

Table II shows the student credit hours for the academic year, exclusive of summer school and reduced to a semester basis for the nine institutions that have reported each of the five years. This represents the number of credit hours taught within the engineering unit and is perhaps the best measure of the total teaching load of the unit. No weighting is provided in this table for upper level, lower level or graduate study credit hours.

TABLE II
"Nine" Institutions
Student Credit Hours for the Academic Year, Semester Basis

School	1967-68	1968-69	1969-70	1970-71	1971-72
I	47,931	37,254	45,441	38,438	36,000
L	46,509	47,158	40,057	36,371	32,800
M	7,258	7,401	5,505	6,680	8,000
N	25,113	27,330	27,646	28,095	27,198
O	17,006	17,563	16,987	14,600	13,858
P	41,886	44,409	43,813	45,623	44,200
Q	80,991	83,239	82,209	81,500	82,400
R	53,667	53,891	54,553	51,900	48,700
S	14,339	15,407	14,909	13,472	14,200
Total	334,700	333,652	331,120	316,679	307,356
Average	37,188	37,072	36,791	35,186	34,150

Table III converts the student credit hours to equivalent full-time students and in the process gives some weighting to graduate level student-credit hours. The conversion was done using 30 semester credit hours as equal to one full-time undergraduate student and 18 semester credit hours as equal to one full-time graduate student. One of the things that becomes apparent from each of these two tables is the teaching load effect of the much discussed decline in engineering enrollment. Institutions I, L, O and R showed a noticeable decline over the span from 1967 to 1971-72. On the other hand, institutions M, N, P, Q and S either stayed about the same or showed some increase during that same period of time. Part of this can be attributed to the effect of the enrollment of past years working its way up to the junior and seniors levels. It is also noted that at the graduate level the number of student hours taken within the engineering unit is much higher in proportion

to the number of hours taken outside of the unit while the reverse is true for freshmen and sophomores.

TABLE III
"Nine" Institutions
Total Full-Time Equivalent Students,
Graduate plus Undergraduate

School	1967-68	1968-69	1969-70	1970-71	1971-72
I	1191	1401	1781	1281	1489
L	1577	1601	1371	1242	1125
M	250	282	195	245	291
N	886	1026	1027	1058	984
O	597	616	590	517	488
P	1537	1614	1643	1654	1606
Q	2995	3066	3102	3054	3114
R	1883	1883	1922	1857	1783
S	497	541	521	477	538
Total	11,413	12,030	12,152	11,385	11,418
Average	1,268	1,337	1,350	1,265	1,269

30 student credit hours = 1 full-time equivalent undergraduate student
18 student credit hours = 1 full-time equivalent graduate student

Table IV shows net square feet of space in thousands for the same institutions over the same period of time.

TABLE IV
"Nine" Institutions
Net Space in Thousands of Square Feet

School	1967-68	1968-69	1969-70	1970-71	1971-72
I	271	331	377	373	358
L	178	206	206	206	206
M	48	48	48	51	68
N	116	123	133	139	167
O	155	154	172	170	196
P	270	242	242	242	286
Q	469	527	569	577	641
R	184	200	171	181	204
S	88	59	59	59	68
Total	1,779	2,160	1,977	1,998	2,194
Average	197	240	219	292	242

For the first four years of this study, the same set of instructions and definitions was used each time. These concentrated on the reporting

of instructional cost to the exclusion of practically everything else. Budgeted figures or appropriated figures were used in the case of state institutions. One result of this was that if a state supported institution had a fully funded but unfilled faculty position, it reported that position in the data even though it may actually have been used to support several teaching assistants. The philosophy was that the institution had a certain amount of resources available to it, and the study measured the use of those resources. Dollars per student credit hour and dollars per full-time equivalent student were computed regardless of what effect nonappropriated funds might have and regardless of how the money might have actually been used. For the 1971-72 year, however, an effort was made to also obtain data about research and outreach expenditures. Instructions also asked for faculty and teaching assistants dollars and full-time equivalent personnel regardless of the source of support. Schools that had foundation grants, sizeable contract research activities, major research divisions, special activities such as industrial extension groups or nuclear reactors supported in part by work done for outside sources, were faced with a difficult task. Part of the task was to allocate the time of individuals to teaching, research, administration and outreach. Previously, some of these had been allocated totally to one activity or another for purposes of these reports. We believe, therefore, that while some of the data reported this year are better, it is not, strictly speaking, comparable to the data from previous years. Perhaps because of the complexities introduced by the division asked for above, some institutions apparently had considerable difficulty bringing together the various cost elements.

In our view, this is a major deficiency of many institutions of higher education. It is not unusual for a dean of engineering to have to pull together funds from several different sources in order to finance a particular project or individual. He may combine appropriated funds for more than one slot, and he may add to this

gift or foundation funds or contract research funds in order to round out the needed sum. This gets the job done, but it makes anything in the nature of a cost study difficult unless considerable amounts of time can be devoted to it. Ideally, therefore, a study of this type should involve enough time for the coordinator to check with each institution at some length, perhaps even to spend several days with the local data collector in order to have the figures on common ground. This has not been done and is not feasible unless the project is put on a funded basis. These comments are made so that readers may understand some of the shortcomings in the tables which follow. These caveats should be kept in mind when reviewing the tables that follow.

Table V-A displays teaching faculty and teaching assistants on a full-time equivalent basis. Table V-B shows the thousands of dollars associated with the full-time equivalent teaching faculty and teaching assistants.

TABLE V-A
"Nine" Institutions
Teaching Faculty and Teaching Assistants
Full-Time Equivalent

School	1967-68	1968-69	1969-70	1970-71	1971-72
I	161	162	151	156	232
L	106	119	113	113	147
M	40	41	40	44	49
N	90	94	98	156	150
O	90	85	78	80	96
P	176	185	188	182	212
Q	272	276	278	263	318
R	170	173	169	175	223
S	51	47	56	53	57
Total	1156	1181	1171	1222	1474
Average	127	131	130	135	163

TABLE V-B
"Nine" Institutions

Thousands of Dollars for Teaching Faculty
and Teaching Assistants

School	1967-68	1968-69	1969-70	1970-71	1971-72
I	1753	2137	2323	2543	4492
L	1206	1395	1471	1567	2271
M	577	544	680	606	670
N	1078	1189	1322	1930	2082
O	1060	1097	1136	1163	1332
P	2165	2326	2586	2717	3026
Q	3759	3891	4212	3882	5912
R	1846	2102	2132	2377	2676
S	616	603	717	757	952
Total	14,060	15,284	16,579	17,542	23,413
Average	1,562	1,698	1,842	1,949	2,601

Table VI-A shows full-time clerical and technician help and Table VI-B the dollars associated with this group of people. It is apparent in examining the 1971-72 figures compared to other years that some institutions included different groups of people in the 1971-72 report than they had previously.

TABLE VI-A
"Nine" Institutions
Clerical and Technicians
Full-Time Equivalent

School	1967-68	1968-69	1969-70	1970-71	1971-72
I	40	45	47	47	171
L	29	32	33	37	55
M	21	19	18	14	17
N	32	36	44	29	39
O	37	33	35	43	30
P	58	59	59	63	63
Q	91	91	90	95	95
R	47	51	52	55	56
S	17	17	18	16	18
Total	372	383	396	399	644
Average	41	42	44	44	72

TABLE VI-B
"Nine" Institutions
Thousands of Dollars for Clerical and Technicians

School	1967-68	1968-69	1969-70	1970-71	1971-72
I	209	248	299	300	1186
L	133	154	185	203	318
M	125	117	143	91	114
N	194	207	274	209	288
O	175	166	278	205	185
P	337	350	383	425	451
Q	494	498	553	589	727
R	243	290	319	387	388
S	92	99	119	108	125
Total	2,002	2,132	2,543	2,517	3,783
Average	222	237	283	280	420

Table VII shows nonsalaried operational budget, and again the 1971-72 discrepancy for some institutions is apparent.

TABLE VII
"Nine" Institutions
Nonsalaried Operational Budget Thousands of Dollars

School	1967-68	1968-69	1969-70	1970-71	1971-72
I	207	260	214	204	1056
L	103	122	138	139	146
M	35	41	41	90	323
N	69	73	88	70	114
O	70	70	118	77	69
P	113	82	91	128	232
Q	168	181	344	201	332
R	160	222	211	582	587
S	51	106	48	44	43
Total	976	1,157	1,293	1,535	2,902
Average	108	129	144	171	323

Table VIII is expenditures for laboratory equipment. This is more consistent than some of the other tables, but, at least in the case of institution M, shows a tremendous variation over the previous years.

TABLE VIII
"Nine" Institutions
Laboratory Equipment, Thousands of Dollars

School	1967-68	1968-69	1969-70	1970-71	1971-72
I	129	360	458	462	624
L	69	24	45	44	69
M	39	33	-	15	269
N	53	83	109	90	80
O	31	31	19	12	15
P	25	493	273	140	336
Q	333	253	550	238	329
R	47	151	153	296	293
S	50	30	31	0	16
Total	776	1458	1638	1297	2031
Average	86	162	182	144	226

Table IX is dollars per student credit hour.

TABLE IX
"Nine" Institutions
Student Credit Hours

School	1967-68	1968-69	1969-70	1970-71	1971-72
I	48.1	80.6	72.2	91.3	237.3
L	32.5	36.0	45.9	53.7	85.2
M	106.9	99.3	157.4	119.6	191.0
N	55.5	56.8	64.8	81.8	103.4
O	78.5	77.7	91.4	99.8	119.1
P	63.1	73.2	76.0	74.8	94.1
Q	58.7	58.1	68.8	60.2	94.7
R	47.4	51.3	51.6	70.2	83.3
S	54.7	54.4	61.4	67.3	74.7
Average	60.6	65.3	76.6	79.9	120.3

Table X, A & B, allocates the 1971-72 data, showing the percentage of FTE personnel and the percentage of dollars assigned to various groups. Table X-B clearly illustrates the well known fact that professional salaries make up by far the greatest part of the cost of higher education. The code letters (A-5, B-1, etc.) refer to columns with the same designations in Tables I-A, 1-B and I-C.

TABLE X-A
"Nine" Institutions
Human Resources Allocation, by Percentage
(F.T.E. Basis)

School	Professional A-5	Graduate Teaching Assistants B-1	Graduate Research Assistants B-3	Clerical C-1	Technicians C-3
I	39.4	7.7	18.1	20.1	14.6
L	60.9	5.9	8.2	15.0	10.0
M	40.0	11.6	30.5	8.4	9.5
N	41.3	8.7	37.0	7.0	6.0
O	54.7	10.1	14.9	14.2	6.1
P	49.7	17.8	12.4	13.4	6.7
Q	64.9	5.3	8.7	13.6	7.6
R	66.3	13.6	10.8	10.8	9.3
S	68.0	5.1	3.9	15.4	7.7
Average	53.9	9.5	16.1	13.1	8.6

TABLE X-B
"Nine" Institutions
Dollar Resources Allocation by Percentage

School	Professional A-6	Graduate Teaching Assistants B-2	Graduate Research Assistants B-4	Clerical C-2	Technicians C-4	Operations E-1	Equipment E-2
I	48.2	4.4	13.9	6.9	7.0	12.4	7.3
L	70.6	3.5	6.8	5.4	5.9	5.2	2.5
M	40.5	3.4	10.0	2.7	4.8	21.1	17.6
N	72.1	1.9	8.9	4.4	5.9	4.1	2.8
O	78.8	1.9	3.0	5.8	5.4	4.2	0.9
P	64.2	8.0	5.5	5.8	4.9	3.5	8.0
Q	72.1	3.7	5.9	5.5	4.4	4.3	4.2
R	62.5	3.5	2.7	3.8	5.8	14.5	7.2
S	78.0	2.3	2.4	6.9	4.9	4.1	1.5
Average	65.2	3.6	6.6	5.2	5.4	8.2	5.8

Table XI provides some interesting ratios. The first column is the ratio of FTE students to the total faculty, including research and administration, plus teaching assistants. The next column is the thousands of dollars per full-time equivalent student, and the final column is the teaching load expressed as student credit hours per full-time equivalent teacher, including the full-time equivalent graduate student. Note that this differs from the usual student-faculty ratio because that ratio often includes some administrative and research personnel, whereas this includes only teaching personnel.

TABLE XI
"Nine" Institutions

	Student-Faculty Ratio	Cost Per FTE Student	Teaching Load in SCH per FTE Teacher
School	FTE Student / (A-5)+(B-1)	Total $(K) / FTE Student	Total SCH / (A-1)+(B-1)
I	7.02	5.74	265
L	7.65	2.48	309
M	5.94	5.25	186
N	6.56	2.86	145
O	5.08	3.44	187
P	6.62	2.59	280
Q	9.89	2.56	354
R	8.00	2.27	268
S	9.44	1.97	323
Average	7.36	3.24	257

Finally, Table XII distributes the total dollars from Table I-C over the three functions of instruction, research and outreach. Most engineering schools either are doing very little in the extension or outreach area or it is all being done from instructional and research budgets and, therefore, does not show up as a separate item.

TABLE XII
"Nine" Institutions
Percent Distribution of the Total Budget

School	Instruction	Research	Outreach
I	49.99	48.70	1.31
L	72.37	26.95	.68
M	63.16	36.84	0
N	47.86	52.14	0
O	86.63	11.64	4.73
P	62.40	35.88	1.72
Q	67.81	32.19	0
R	53.91	44.39	1.70
S	84.45	14.89	.66
Average	65.40	33.74	1.20

Once more, it is worth noting that the definitions used in 1971-72 report are sufficiently different from those used in previous reports as to make comparisons dangerous. Even so, there is some interesting and useful information contained in all of these figures that you may want to have. As a sidelight, one institution asked the department heads to make an allocation of time for each faculty member between teaching, research, extension and administration. The results were reported to the dean's office as departmental totals. The sum of full-time equivalent personnel assigned to each of the functions arrived at in this way is somewhat different from the full-time personnel as carried on the budget books. In addition, several department heads indicated that it was an interesting exercise affording a more detailed look at individual faculty members' workloads than had been made previously. Some institutions, usually at the prodding of a state-level administrative agency, are being asked to report such data, and the probabilities are that this trend will increase.

For the convenience of those who would like to dig deeper into this subject, a list of references is attached. In particular, we suggest a look at reference number 8. This provides a chance to look ahead and a chance to look at total cost versus the partial or direct cost around which this report is structured.

1. J. L. Merriam, "Administrative Planning Factors in Engineering Education", Engineering Education, Vol. 60, pp. 452-455, February 1970.

2. H. L. Manning and R. G. Carson, "Administrative Planning Factors in Engineering Education - A Two-Year Comparison", Engineering Education, Vol. 61, No. 7, April 1971.

3. F. E. Terman, "Economic Factors Relating to Engineering Programs", Journal of Engineering Education, Vol. 59, No. 6, February 1969, pp. 510-514.

4. F. E. Terman, "A Study of Engineering Education in California", prepared for the Coordinating Council for Higher Education State of California, 1968.

5. F. E. Terman, "Engineering Education in New York", prepared for the State Education Department, Albany, New York, March 1969.

6. M. S. Peters, "Ratios and Factors for Teaching and Space Requirements for Quality Engineering Education", presented at the Annual Conference of the American Society for Engineering Education, Columbus, Ohio, June 23, 1970.

7. Guy Black, "On the Cost of Engineering Education", Program of Policy Studies in Science and Technology, The George Washington University, Washington, D. C., Monograph No. 7, November 1970, Established under NASA Research Grant NGL 09-010-030.

8. K. H. Dukiet, The Cost of Higher Education 1972-73, College Management, January 1973.

Appendix

SOUTHEASTERN SECTION - ASEE PLANNING FACTORS STUDY

1971-72 Data

Definitions

Introduction:

The purpose of this study is to get as complete a cost picture as practical for analysis and use by engineering department heads and deans. All of the personnel of the engineering unit and all of the dollars should go one place or another in the study. It is not possible to cover every contingency by definition, but we believe the major thrust of each part is clear. When necessary, use estimates of the breakdown of time and dollars. Actual allocations of money do not always follow exactly the budgeted items. Please use actual or estimated actual if you can. If the figures you use are budgeted (as distinct from actual), please so state.

A. Faculty and Professional Personnel: To obtain a uniform base for comparison in this study, we suggest establishment of a full-time faculty member as that person who teaches 12 credit hours of undergraduate classes and has no other responsibilities. If your school has some other standard definition, use it and note what it is at the bottom of the form. Then, arbitrarily divide activities other than teaching as follows in order to develop a picture of faculty duties on a reasonably realistic basis. It will be necessary to read through the items below, then apportion each person's time to come out with the appropriate load factors. "Faculty" is used here to include all personnel in the Engineering School except those under "B" and "C" participating in any constructive manner in forwarding the activities of the school, such as academic administrators, deans, department chairmen, directors (research, extension, etc.), part-time instructors, visiting professors, etc.

1. Instructional - For instance, a faculty member assigned 6 credit hours of teaching = 0.5 F.T.E. instructional. Student advising, graduate student supervision, development of a new course, rebuilding a laboratory, etc., should be included under instructional.

2. Research - For instance, a faculty member assigned to direct and participate in research half-time would be listed as 0.5 F.T.E. research regardless of whether internally or externally funded. Care must be observed here between the faculty member's active participation and serving as chairman or member of a committee for a graduate student whose research is to be used as a part of the student's degree requirements. This latter type of activity should be assigned and counted as a part of instruction activity.

3. Outreach Activity - For instance, a faculty member is engaged in on or off-campus extension work, short courses, or off-campus credit or non-credit courses for which an equivalent of half load is granted. He would be listed as 0.5 F.T.E. "Outreach."

4. Administrative and Related. For instance, a faculty member is assigned to assist an administrative officer, serve on a committee or similar functions. If the sum total of this relief is considered to be a half load, he would be listed as 0.5 F.T.E. Administrative. Under this category, the dean and members of his staff not directly engaged in teaching, research or outreach would be 1.0 F.T.E. regardless of basis of funding.

5. Total $(K) is salary from all sources whether assignment is for the academic year (usually 9 months) or as in the case of administrative personnel for 12 months.

B. Graduate Student Assistants: A graduate student serving as a teaching or research assistant and paid for half time would be counted as 0.5 F.T.E. Do not count his summer activity or summer compensation. Dollars and F.T.E. may later be combined with other data to give complete teaching and research pictures, but some institutions will find separate graduate student data useful.

C. Other Personnel: Duties related to the prescribed mission of the engineering school. 1.0 F.T.E. equals a usual 40-hour week assignment, and $(K) is usually 12 months.

1. & 2. Clerical Personnel - Usually typists, stenographers, secretaries, and other office personnel. Report F.T.E. Column (1) and $(K) Column (2) regardless of source of support so as to be able to relate to total faculty data.

3. & 4. Technicians - Usually machinists, electricians, mechanical or other specialized technician activities usually distinguished from faculty as requiring less than a B. S. level of educational training. Report F.T.E. Column (3) and $(K) Column (4) regardless of source of support so as to be able to relate to total faculty data.

D. Student Credit Hours: A measure of the total instructional load during the entire academic year (excluding summer school) for all courses taught by the engineering faculty. One student taking a 3-semester hour course for one semester accounts for 3 SCH. A 3-semester hour course is typically one which meets for 3 lecture hours per week for one semester. If on a quarter system, please convert to a semester basis (multiply the total SCH by 2/3). Report to the nearest hundred credit hours.

1. Student credit hours taught by the engineering unit and normally taken by undergraduate students during the freshman and sophomore years.

2. Same for courses usually taken during the junior and senior years.

3. Student credit hours of beginning graduate engineering courses (master's level). Include master's level thesis research. Courses open to seniors and graduate students should be classified according to the level taught.

4. Student credit hours of advanced graduate engineering courses, including credit assigned for thesis research taken by graduate students. (Ph.D., D. Eng., etc). If impossible to divide beginning from advanced, give total.

E. Other Planning Factors:

1. Nonsalaried Operational Budget - Include all nonsalaried items supplied on a regular annual basis to the engineering unit from institutional or other available funds for regular operational purposes. Included are the provisions for teaching laboratory supplies, office supplies, administrative travel, freight, postage, telephone, etc.

2. Laboratory Equipment - Include total annual expenditures from all sources for equipment items used for teaching or research laboratories. This item is intended to represent the annual support level for laboratory equipment. Laboratory supplies and other expendables should be included under E. 1. Report to the nearest thousand dollars.

3. Net Space ($ft.^2$) - Space which is assignable by the engineering unit for its programmed activities. Report to the nearest thousand square feet. Included are:

   offices of administrative staff, professors, nonacademic personnel, and graduate assistants

   laboratories, both teaching and research

   computer spaces if used predominantly for engineering teaching and research

   library space where designated as an engineering library, departmental or school

   specialized classroom or demonstration spaces, such as design or computational rooms, which are specifically assigned for engineering use and which are not normally available for nonengineering uses

   shop spaces which are under the control of the engineering unit, spaces assigned to activities such as engineering student government, publications, radio station and lounge

   Excluded are:

   entrance spaces and hallways

   washrooms

   janitorial spaces

   general classrooms which may or may not be used for engineering classes, even if in an engineering building and during some terms used 100% for engineering courses; if other (nonengineering) use is not precluded.

NOTE: Interior spaces are generally measured from wall centerline. It does not appear feasible to differentiate graduate from undergraduate spaces.

F. Division of Total Budget $(K) By Source: The purpose is to divide all funding between the three usual categories of instruction, research, and extension or outreach, and further subdivide these into inside and outside sources. The total of these should equal the total of columns A-6, B-2, B-4, C-2, C-4, E-1 and E-2.

Instructional - Inside - (Column 1): Those funds allotted from usually internally controlled sources, i.e., legislative appropriation and/or regular income from endowment, etc.

Other - (Column 2): federal or other grants, usually given to support a special program as outlined in a formal proposal. The same type of distinction is used for research (Columns 3 and 4) and outreach (Columns 5 and 6) funds.